

Report Date: 30 Apr 2012

**Summary Report for Individual Task
551-88L-3050
Troubleshoot a Starting System
Status: Approved**

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

DESTRUCTION NOTICE: None

Condition: Aboard a vessel; at sea or pier side; day or night; under all sea and weather conditions given a starting system.

Standard: The Soldier troubleshoots a starting system found onboard Army watercraft.

Special Condition: None

Special Standards: None

Special Equipment:

Safety Level: Medium

MOPP:

Task Statements

Cue: None

DANGER
None

WARNING
None

CAUTION
None

Remarks: None

Notes: None

Performance Steps

1. Demonstrate basic knowledge for troubleshooting a vessel starting system.

ENGINE WILL NOT START		
ENGINE CANNOT BE CRANKED NOR BARRED OVER	ENGINE CANNOT BE CRANKED BUT CAN BE BARRED OVER	ENGINE CAN BE CRANKED BUT FAILS TO START
Improperly engaged jacking gear Seized piston Obstructions in cylinder Improper bearing fit	Depleted air supply Closed air line valve Engaged jacking gear interlock Faulty air-starting distributor Faulty cylinder air-starting valves	Improper throttle setting Contaminated fuel Insufficient fuel supply Improper fuel Improper fuel system Insufficient compression Tripped overspeed device Inoperative governor Inoperative cold starting device Insufficient cranking speed

Troubles Which May Prevent a Diesel Engine From Starting
Figure 551-88L-3050_01

a. Engine cannot be cranked nor barred over.

(1) Crankshaft should be turned one or more revolutions before starting power is applied.

(a) Check the turning gear to be sure that it is properly engaged.

(b) Check to see whether the cylinder test (relief) valves or indicator valves are closed and are holding water or oil in the cylinder.

Note: When the turning gear operates properly and the cylinder test valves are open but the engine nevertheless cannot be cranked or barred over, the source of the trouble is probably of a serious nature.

(2) A piston or other part may be seized or a bearing may be fitting too tightly.

Note: Some engines have ports through which pistons can be inspected.

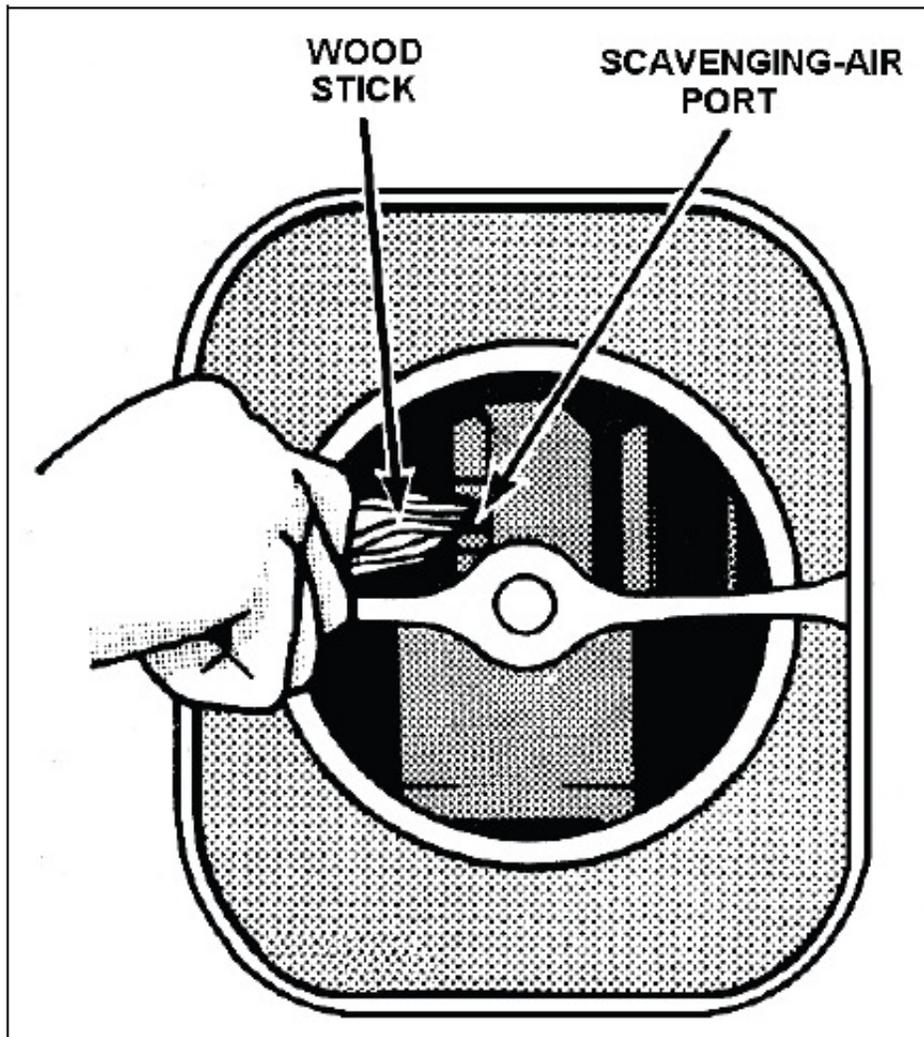
(a) Sometimes the difficulty cannot be remedied except by removing a part or an assembly.

1 If inspection reveals that the piston is defective, the assembly must be removed.

2 Figure 551-88L-3050_02 shows the testing for stuck piston rings through the scavenging-air distributor manifold port.

3 If the condition of an engine without cylinder ports indicates that a piston inspection is required, the whole assembly must be taken out of the cylinder.

(b) Engine bearings have to be carefully fitted or installed according to the manufacturer's instructions.



Checking the Condition of the Piston Rings
Figure 551-88L-3050_02

b. Engine cannot be cranked but can be barred over.

(1) Air-starting system malfunctions.

(a) Defect in timing mechanism.

(b) Faulty air-starting valves.

(2) Electric start malfunctions.

(a) Electric starting system malfunctions fall into the following categories:

1 Nothing happens when the starter switch is closed.

2 Starter motor runs but does not engage the engine.

3 Starter motor engages but cannot turn the engine.

(b) If the engine can be barred over, there is excessive friction in the meshing of the starter pinion and the ring gear.

c. Engine can be cranked but fails to start.

(1) Foreign matter in the fuel oil system.

(a) Water. Accumulation of water in a fuel system must be prevented, not only to eliminate the cause of corrosion but also to ensure proper combustion in the cylinders.

(b) Air. Air in the fuel system is another possible trouble which may prevent an engine from starting.

(2) Insufficient fuel supply.

(a) Lines. Leakage in low-pressure lines of a fuel system can usually be traced to cracks in the piping.

(b) Tanks. Although most leakage occurs in the fuel lines, leaks may occasionally develop in the fuel tank.

(c) Clogged fuel filters. Another factor that can limit fuel supply to such an extent that an engine will not start is clogged fuel filters.

(d) Inoperative fuel transfer pumps. If the supply of fuel oil to the system is to be maintained in an even and uninterrupted flow, fuel transfer pumps must be functioning properly.

(3) Malfunctioning of the injection system.

(a) Overheating.

(b) Lowered firing pressure.

(c) Smoky exhaust.

(d) High exhaust temperatures.

(e) Loss of power.

(4) Insufficient compression.

(5) Inoperative engine governor.

(6) Inoperative overspeed safety devices.

(7) Insufficient cranking speed.

2. Demonstrate basic knowledge of irregular engine operation.

a. The engine operator must be constantly alert to detect any symptoms which might indicate the existence of trouble.

b. Forewarning is often given in the form of sudden or abnormal changes in the supply, temperature, or pressure of the lubricating oil or cooling water.

(1) Color and temperature of exhaust afford warning of abnormal conditions and should be checked frequently.

(2) Fuel, oil, and water leaks are an indication of possible troubles. Keep the engine clean to make such leaks easier to spot.

(Asterisks indicates a leader performance step.)

Evaluation Preparation: None

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Demonstrated basic knowledge for troubleshooting a vessel starting system.			
a. Engine cannot be cranked nor barred over.			
b. Engine cannot be cranked but can be barred over.			
c. Engine can be cranked but fails to start.			
2. Demonstrated basic knowledge of irregular engine operation.			
a. Operator constantly alert to check any symptoms.			
b. Operator checking for any abnormal changes.			

Supporting Reference(s): None

Environment: None

Safety: In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

Prerequisite Individual Tasks : None

Supporting Individual Tasks :

Task Number	Title	Proponent	Status
551-88L-2053	Repair a Diesel Engine	551 - Transportation (Individual)	Approved

Supported Individual Tasks :

Task Number	Title	Proponent	Status
551-88L-1028	Demonstrate Basic Knowledge of a Starting System	551 - Transportation (Individual)	Analysis

Supported Collective Tasks :

Task Number	Title	Proponent	Status
N/A	N/A	Not Selected	Obsolete